Safety Guidelines
for Commercial Parasailing Operations
December 2014
Disclaimer

Relevant legislation, including the Maritime Transport Act 1994, Civil Aviation Act 1990, Maritime Rules, Civil Aviation Rules and the Health and Safety in Employment Act 1992, is amended from time to time and we intend to update these safety guidelines to reflect such amendments if necessary. However, the onus is on operators to check that they are operating to the latest Maritime Rules, Civil Aviation Rules and other legislation and they should not rely on these guidelines for currency. The reader should check Maritime New Zealand’s website (maritimenz.govt.nz – search for ‘guidelines’) to ensure they have the most current version of these guidelines.
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1. Introduction

1.1. Purpose and relationship to other guidelines

These safety guidelines have been created to assist operators of commercial parasailing operations to develop and implement their safety systems and to deliver their activities safely. They have been developed with input from government departments, operators and associated professionals.

**Note:** These guidelines are intended to operate alongside Maritime New Zealand’s (MNZ’s) *Safety Guidelines for Passenger and Non-Passenger Vessels*, which can be found on MNZ’s website at maritimenz.govt.nz. They provide activity-specific safety information for operators of commercial parasailing operations that is not covered in the *Safety Guidelines for Passenger and Non-Passenger Vessels*.

Where the activity of parasailing involves a parachute being towed behind a boat, it is regulated under the Maritime Transport Act and the Civil Aviation Act. The specific rules are set out in the Maritime Rules applicable to the operation of ships (which can be found on MNZ’s website at maritimenz.govt.nz), and *Civil Aviation Rule Part 101: Gyrogliders and Parasails; and Unmanned Balloons, Kites, Rockets and Model Aircraft – Operating Rules* (which can be found on the Civil Aviation Authority’s website at www.caa.govt.nz).

These guidelines are issued by the Director of Maritime New Zealand and set out recommended safety practices. They do not specify or replace all of the applicable legal obligations and operators should ensure that they are aware of and operate in accordance with all applicable legal requirements.

Operators of commercial parasailing operations should read the *Safety Guidelines for Passenger and Non-Passenger Vessels* and Civil Aviation Rule Part 101 first.

Good safety practice consists of:

- operating to an acceptable safety standard
- complying with applicable legislation
- continually improving safety systems, including keeping up to date with current practice.

The guidelines set out recommended methods of achieving components of what MNZ considers to be an acceptable safety standard, which are intended to be additional to any applicable legal requirements, including those in Maritime Rules and Civil Aviation Rules. Unless otherwise expressly stated in these guidelines, MNZ expects to see these methods,
or comparable methods that can be shown to produce the same safety outcomes, reflected in an operator’s Maritime Transport Operator Plan developed under Maritime Rule Part 19. Consistency with these guidelines will be assessed for the issue of a Maritime Transport Operator Certificate by considering whether an operator has implemented the specific recommendations or has developed an alternative approach that the Director of Maritime New Zealand (the Director) considers is likely to produce an equivalent outcome.

Operators should note, however, that these guidelines are of a general nature and do not cover the operation-specific detail that MNZ expects to see in any particular safety system. Safety systems will be assessed as a whole, taking into account all relevant issues, including the implementation of this guidance material.

Operators should be aware that the Civil Aviation Authority has regulatory oversight of the airborne aspect of parasailing and ensure that they comply with applicable civil aviation rules.

1.2. Intended audience
These guidelines are intended for all operators of commercial parasailing operations.

1.3. Relationship to legislative requirements
As an operator of a commercial parasailing operation, you have obligations under legislation such as the Maritime Transport Act 1994 (MTA), Civil Aviation Act 1990, the Maritime Rules, Civil Aviation Rules and the Health and Safety in Employment Act 1992 (HSE Act). Operators should make themselves familiar with the requirements of this legislation.

In general, the MTA and the rules made under that Act focus on vessel-related safety, the Civil Aviation Act and the rules made under that Act focus on safety in the air, and the HSE Act focuses on the safety of people in the workplace. However, there is a degree of overlap, and Maritime Rule Part 19 focuses on whole maritime transport operations.

Maritime Rules and Civil Aviation Rules are legal tools made by the Minister of Transport under the MTA and Civil Aviation Act 1990, respectively. While the MTA specifies broad principles of maritime law and the Civil Aviation Act 1990 specifies broad principles of aviation law, the respective rules contain detailed technical standards, requirements and procedures.

In addition, the HSE Act provides for the safety of people in the workplace, including by requiring employers and others to take all practicable steps to ensure that no person is harmed in a place of work or through its activities. Vessels providing commercial parasailing
operations are places of work. All practicable steps, in this context, will depend on the specific circumstances of the operation’s activities.

1.4. These guidelines

Nothing in the guidelines releases operators from their responsibility to meet their full obligations under the law and to ensure that their operations are managed safely.

Maritime Rule Part 19.42(1)(b) states that:

A maritime transport operator must develop and document a maritime transport operator safety system in the Maritime Transport Operator Plan that is consistent with safety guidelines and other safety information provided by the Director of Maritime New Zealand and best practice information contained in relevant industry codes of practice.

These guidelines are provided by the Director. For this reason, operators operating under Maritime Rule Part 19 will need to ensure that their safety system is consistent with these guidelines. For operators operating under a deemed Maritime Transport Operator Certificate (see section 2.1), compliance with these guidelines is voluntary, but operators are strongly encouraged to give them full consideration.

1.5. Health and Safety in Employment Act 1992

The HSE Act places duties on employers, people who control a place of work, self-employed people, principals and employees to ensure that nobody is harmed in a place of work or by a person who is at work.

The HSE Act requires you to ensure that your employees are adequately trained to perform their duties and adequately supervised. The HSE Act further requires employers to take a systematic approach to the management of hazards, including identifying and assessing the significance of hazards, as well as implementing management strategies and processes that either eliminate, isolate or minimise hazards. Hazards in this case are all factors that have the potential to cause harm to people.

1.6. Health and Safety in Employment (Adventure Activities) Regulations 2011

Commercial vessels providing parasailing operations are not covered by the requirements of the Health and Safety in Employment (Adventure Activities) Regulations 2011 (which require adventure activity operators to obtain a safety audit and be registered) to the extent that, as
commercial vessels, they are covered by a maritime document (see Regulation 4(3)(a)). Air-based activities are also not covered by the requirements of these regulations.

However, there may be aspects of your operation that are covered by the Adventure Activities Regulations or other legislation, and you should ensure that you are aware of and comply with any legal requirements that apply.

1.7. Other matters

These guidelines are developed solely for the safety of people and do not replace or discharge operators’ broader responsibilities under legislation managed by other agencies such as the Civil Aviation Authority of New Zealand and regional councils.

2. Prerequisites for operating

2.1. Safety system

The Director is responsible for assessing an operator’s Maritime Transport Operator Plan in accordance with the process outlined in Maritime Rule Part 19. No person may operate a commercial vessel without a valid Maritime Transport Operator Certificate. The Maritime Transport Operator Certificate is a maritime document for the purposes of the MTA. Subpart D of Maritime Rule 19 sets out the provisions for holders of Safe Ship Management Certificates as they transition into the Maritime Operator Safety System (MOSS).

Specific legal requirements also apply to persons operating parasails in Civil Aviation Rule Part 101: Gyrogliders and Parasails; and Unmanned Balloons, Kites, Rockets and Model Aircraft – Operating Rules made under the Civil Aviation Act 1990. No person may operate a parasail without complying with those rules. The Civil Aviation Authority is the regulatory body for the airborne component of parasailing activities.

2.2. Fit-for-purpose certificate / certificate of survey

All commercial vessels must have a valid fit-for-purpose certificate or certificate of survey\(^1\) in force at all times applying to the vessel and its equipment in accordance with Maritime Rule 44.

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\(^1\) Under Safe Ship Management, a vessel is issued with a fit-for-purpose certificate. From 1 July 2014, the fit-for-purpose certificate is a deemed certificate of survey until the vessel enters into MOSS and a certificate of survey is granted.
2.3. Audit

The Director will audit the Maritime Transport Operator Plan from time to time to determine whether it is:

- implemented effectively
- suitable to achieve the safety management system objectives
- compliant with the applicable requirements of Maritime Rule Parts 19 and 44.

3. General harm prevention

As well as being aware of specific hazards and having effective safety systems to manage them, there are a range of general steps that can be taken to reduce the risk of harm to anybody involved with a parasailing operation. MNZ’s Safety Guidelines for Passenger and Non-Passenger Vessels cover some of these, but specific safety guidance for operators of commercial parasailing operations is set out below.

3.1. Operating zones and areas

Civil Aviation Rules 101.7, 101.9, 101.11, 101.253, 101.255 and 101.257 cover restricted, military operating, and danger areas; low flying zones; controlled airspace; aerodromes; operating above a height of 400 feet above ground level; distance below cloud; and required ground visibility. These rules must be complied with (and can be found in Appendix B of these guidelines).

Operators should also consult with other commercial parasailing companies operating in the same area to ensure each company’s parasailing operations are a safe distance from each other. A general guide is to operate no less than 2km from any other parasailing operation and with the shortest length of any navigable waterway used for parasailing being 2km. However, wind and other conditions may mean greater minimum distances are appropriate. Adhering to these minimum distances (from other parasailing operations and for length of navigable waterways) does not necessarily mean you are operating safely. You should consider what is safe according to your specific operation and circumstances.

Commercial vessels must also operate within the operating limits assigned to them in accordance with Maritime Rule Part 20 (Operating Limits). In general this is likely to be within inshore limits.

Parasailing should not occur from beaches or platforms.
### 3.2. Operating wind and weather conditions

Civil Aviation Rules 101.257, 101.259 and 101.271 cover meteorological limitations, night operations and wind speed. These rules must be complied with (and can be found in Appendix B of these guidelines).

Within the wind speed limitation set by Civil Aviation Rule 101.271, operators should also ensure that the wind conditions for parasailing are within the parameters set in the manufacturer's specifications for the parasailing equipment or within safer parameters if it is necessary to maintain safety.

Operators should source good advice about monitoring weather conditions for safe parasail operation, such as [ASTM F2993-13 Standard Guide for Monitoring Weather Conditions for Safe Parasail Operation](https://www.astm.org/Standards/F2993.htm), check the weather forecast before departing the dock, monitor the weather forecast at all times and keep daily weather logs. Information about ASTM F2993-13 can be found at www.astm.org/Standards/F2993.htm.

Operators should develop operating policies that cover wind and wave restrictions, and inclement weather. These must show compliance with Civil Aviation Rules.

### 3.3. Operating visibility conditions

Civil Aviation Rules 101.257 and 101.259 cover meteorological limitations and night operations. These rules must be complied with (and can be found in Appendix B of these guidelines).

The skipper of the vessel should also have good all-round visibility of the vessel, as well as visibility of the chute while it is in flight.

### 3.4. Launching and lookout

The skipper of a commercial vessel used for parasailing should ensure that a person other than themselves supervises activity at the launching point.

The skipper should ensure that the launching point supervisor keeps a lookout for sources of danger on the deck, at sea and in the air, at all times during each parasail flight, and informs the skipper of any actual or potential sources of danger observed.

### 3.5. General operating restrictions

Civil Aviation Rule 101.273 covers passenger age limitations. This rule must be complied with (and can be found in Appendix B of these guidelines).
Additionally, operators should have clear parameters and procedures in the operation’s safety system to identify when operations will cease due to increased risk to parasailors from any external influences (for example, dangerous sea or lake conditions).

### 3.6. Safety briefings and information

Civil Aviation Rule 101.265 covers pre-flight briefings. This rule must be complied with (and can be found in Appendix B of these guidelines). Additionally, clear and comprehensive briefings and safety information should be provided to passengers about the vessel. Briefings and information should include:

- A verbal briefing at the start of the trip (and at subsequent passenger pickup points, if any), with relevant parts repeated before the parasail component of the trip starts
- Written material, stylised visual displays and clear and comprehensive safety signage in languages or pictorial forms designed to be understood by as many passengers as reasonably possible
- Advice that parasail rides may put people suffering from medical conditions at heightened risk of harm (for example, stress from being airborne, sudden exposure to cold water, panic, or the physical nature of the activity aggravating heart disease, which could result in cardiac arrest and possibly death)
- Information on the operation’s website, in crew and passenger safety briefings and in passenger information sheets about the importance of disclosing passengers’ medical conditions, and sensibly managing such conditions
- Hand signals to be used to and from parasailors.

Commercial parasailing operators should also provide a briefing about water landing scenarios. This briefing should include:

- A basic description of the parasail canopy and its position should a water landing occur
- Awareness of the flotation device fitted to each passenger
- Reassurance to remain calm while in the water
- The passenger recovery plan.
3.7. **Fitness to take part in operation**

A process should be in place to ensure that skippers, crew members and other staff are mentally and physically fit to undertake their duties. The process should be sufficient to ensure that skippers, crew members and other staff do not participate in the operation where in the opinion of the operator they are impaired by fatigue, medical condition, or by the consumption of alcohol or drugs to a degree that they may be a risk to the safety of themselves or passengers.

3.8. **Equipment – general**

Civil Aviation Rules 101.261 and 101.269 cover airworthiness of parasails and operating procedures. These rules must be complied with (and can be found in Appendix B of these guidelines).

However, MNZ expects that all equipment is fit for purpose (including suitable for the conditions) and is fitted, inspected, maintained, replaced and used in accordance with the manufacturers’ specifications, or to a higher safety standard if needed to maintain safety.

No equipment should be used by any person if the operator knows or suspects the equipment is unsafe. Examples of unsafe equipment are when equipment may have been weakened by ultraviolet light or damaged, or the equipment is ill fitting or incorrectly sized for the user.

If any equipment is purchased second-hand, it is critical that the operator is absolutely certain of its history, including frequency of use, extent of exposure to saltwater and sun, and so on. If the equipment’s history and previous use is at all unclear, it should not be used.

All equipment should be listed in the operation’s maintenance plan to ensure the equipment’s condition is routinely inspected. Any repairs or replacement of equipment should be recorded.

Operators should ensure that daily inspection and maintenance checks of the parasail vessel, parasail canopy, parasail harnesses, towline, winch system, helmets and related equipment are carried out to make certain all equipment is properly maintained, in a safe operating condition, and any remedial action is undertaken. Equipment stowage conditions, protective rails and padding should also be checked.

Operators should keep maintenance logs for parasailing equipment.
3.9. Equipment – specific

Civil Aviation Rule 101.263 sets out specific requirements for safety equipment. These rules must be complied with (and can be found in Appendix B of these guidelines). The following sets out safety guidance on the selection, repair, maintenance and use of certain equipment.

3.9.1. Parasail chutes and yokes

Operators should undertake research to ascertain whether or not the parasail chutes and yokes they are purchasing come from a reputable manufacturer and are likely to be of good quality.

Where chutes require repair, this should be undertaken by someone with the knowledge and expertise to ensure safety is not compromised to any degree whatsoever.

Chutes and harnesses should be checked daily before use.

Chutes, yokes and ropes should never be modified contrary to manufacturers’ instructions.

3.9.2. Towlines

Civil Aviation Rule 101.267 states that a person must not release the towline of a parasail in flight except in an emergency. This rule must be complied with.

Additionally, all towlines should:

- be used in accordance with the rope manufacturer’s instructions
- have a minimum breaking strain of 4500kg
- be a rope type that is a low-stretch, static line and made of high-quality materials suitable for parasailing
- have ropes trimmed as necessary, and tested according to the manufacturer’s instructions or replaced annually or when visual wear is detected or as the manufacturer specifies
- be kept clear of all obstacles, and kept clean and free of grease, oils and petroleum products.

3.9.3. Harnesses

All harnesses should:

- be dated from new
- be stored and dried in the shade
be maintained to the manufacturer’s recommendations

be replaced every five years (non-UV-resistant webbing and thread) or 10 years (UV-resistant webbing and thread), or earlier according to the manufacturer’s instructions or if it is necessary to maintain safety

have gated karabiners, rated to an appropriate strength

show no visible signs of wear and tear.

3.9.4. Equipment for multiple passengers

Multiple-passenger flights should only occur when equipment specifically designed for such an activity, such as tandem or triple bars, is used in accordance with the manufacturer’s instructions. Where possible, bars should be padded to protect passengers.

3.10. Vessel seating

All seating should be located forward of the launch pad.

3.11. Number of parasailing passengers flown together

Operators should limit the maximum number of passengers that are flown together to three.

3.12. Emergency response plans and procedures

Appropriate emergency response plans and procedures should be in place for emergency situations that may arise, even if these emergencies are unlikely to occur. All crew should be familiar with and trained in emergency response and procedures, including undergoing regular drills (at least every six months). Operators should ensure that on each trip, all crew and passengers are aware of what to do in an emergency.

Emergency situations that should be addressed include: line separation; winch or engine failure; damage of the ship; capsize; medical emergency of parasailor in flight; and incapacity, injury, or illness of a passenger (including hypothermia).

Emergency response plans should also include a record of emergency equipment carried on board, and provide for the equipment to be regularly checked and maintained.
3.13. **Staffing**

Maritime Rules establish required crewing ratios, and these must be complied with. However, a minimum of two experienced crew members should be aboard the vessel at all times during the operation of any parasailing boat. Additionally, there may be aspects of your operation that mean a higher number of crew and other staff would be appropriate for safety purposes. The number of crew and other staff should be appropriate for the circumstances taking into account the weather conditions, age and experience of any passengers and the parasailors, and any other relevant factors.

3.14. **Recommended training, skills and experience**

All personnel involved in the activity, including the operator/skipper and other crew, should be adequately trained, skilled and experienced for the roles they perform and to address the potential risks of providing parasailing operations. The paramount consideration should be safety – so the training, skills and experience must be sufficient and appropriate to ensure that the operation can be conducted *safely*.

The operator/skipper of a commercial vessel used for parasailing should have experience gained over a period of at least three months, including:

a) In situations where the **deckhand** controls the winch, the operator/skipper should have:

- been a parasailing deckhand for 500 parasail flights, with the first 100 supervised
- controlled a vessel used for parasailing under direct supervision, using differing parasail sizes and under a range of weather conditions for at least 100 parasail flights:
  - the first of which were made using weights to simulate a parasailor until the supervisor is satisfied that the trainee skipper can perform their duties safely
  - with at least 50 of the first 100 flights towing a parasailor.

b) In situations where the **skipper** controls the winch, the operator/skipper should have:

- been a parasailing deckhand for 250 parasail flights, with the first 100 supervised
- controlled a vessel used for parasailing under direct supervision, using differing parasail sizes and under a range of weather conditions for at least 350 parasail flights:
  - the first of which were made using weights to simulate a parasailor until the supervisor is satisfied that the trainee skipper can perform their duties safely
  - with at least 50 of the first 100 flights towing a parasailor.
The skipper of a parasail vessel should not undertake a parasail operation without an instructor being available until the skipper is fully trained to deliver the activity, has at least a local launch operator or skipper restricted limits (SRL) certificate, and has been assessed by the supervisor as being competent to be a skipper of a parasail vessel.

All crew should have a current first aid certificate.

A written or electronic record should be kept of the relevant qualifications, training and experience of each person involved in conducting the parasailing operation.

3.15. Periodic reviews

A review of procedures should be undertaken at least every 12 months and as soon as practical after every incident, accident or mishap to check that:

- the operation’s Maritime Transport Operator Plan is being followed
- the correct and full safety training is being provided to crew
- a clear and comprehensive safety briefing is being given to passengers
- any poor practices are identified and improved procedures implemented as soon as possible.

Reviews should also determine what could be learnt when accidents or incidents (including near-misses) happen among other operators, or new knowledge about risks or equipment becomes available.

The practices of the skipper and the staff delivering the parasailing operation should be periodically peer reviewed. The reviews should be of a sufficient scope and frequency to ensure that the skipper and staff are adequately trained, current and proficient for their duties, and should not be undertaken as a self-assessment. Where a review identifies any adjustments needed to safety measures, those adjustments should be carried out as soon as practicable.

**Note:** Under the MTA and HSE Act there are obligations to report accidents, incidents or mishaps involving serious harm. Under the MTA, the master of a New Zealand ship (or a foreign ship in New Zealand waters) must report these matters to MNZ as soon as practicable. Other people may also be required to report those matters under Maritime Rules. Under the HSE Act, an employer, self-employed person or principal must report serious harm or accidents involving a ship as a place of work to the Director of MNZ as soon as possible.
after they become aware of the occurrence. Further information on the requirement to report can be found at http://maritimenz.govt.nz/Commercial/Accidents-and-investigations/Accidents-and-investigations.asp

4. Specific identified hazards

4.1. Towline failure

Towline failure has been found to be the leading cause of injury and death in parasailing accidents in the United States. A 2009 US Coastguard study covering 27 parasailing accidents found that towline failures accounted for more than half the total injuries and all three of the deaths reported during the period the study covered. Similarly, of eight parasailing accidents monitored by the US National Transportation Safety Board (NTSB), the towline parted in five cases.

A key warning to operators is to never tie knots in the towline. The NTSB studied several parasailing accidents and “verified that the knot most commonly used by parasailing operators to fasten their towlines is a bowline knot. In subsequent laboratory testing, the NTSB confirmed that this knot (and any knot in general) can reduce towline strength by as much as 70 percent, even on brand-new, otherwise-strong ropes. When the testing also factored in sun and saltwater exposure, sudden ‘shocks’ by wind gusts or other overloads, and general wear-and-tear, the ropes weakened further.”

Additionally, all of the surfaces that contact the towline should be smooth and include rolling pulleys and rotating or swivel heads. Sliding fixed surfaces are not recommended.

4.2. Instability of the vessel

A further key safety issue for crew, passengers and parasailors from this type of operation is the potential for instability of the vessel because of speed and the weight of pulling the parasailor. Maritime Rule Part 40A specifies stability and freeboard tests to be used when a surveyor surveys your vessel for a fit-for-purpose certificate or certificate of survey. However, as part of meeting your health and safety obligations, you may ask a surveyor to undertake

4 Ibid.
5 “The NTSB tested three types of rope commonly used by parasailing operators: 3/8”- and 7/16”-diameter double-braid polyester, and 5/16”-diameter single-braid polyethylene.” Ibid, p.34.
6 Ibid, p.34.
more rigorous tests that take into account the special vessel stability concerns associated with parasailing.

Appendix A provides a suggested more rigorous stability test. Alternatively, other steps should be taken to ensure that your vessel will remain stable while providing parasailing operations.

The appropriate length for vessels used for parasailing should be considered in relation to chute size. It is recommended that the design of any vessel providing parasailing is approved by a naval architect and tested for stability under working conditions by an approved surveyor.

4.3. Engine or other machinery failure

Engine or other machinery failure is also a risk to the safety of parasailing. Operators should ensure that the engine and machinery is regularly maintained.

Water should not go into the watertight machinery space(s); it should either be pumped off on deck or through the scuppers.

4.4. Falling from the chute

Civil Aviation Rule Part 101 states that a person operating a parasail must ensure that each person carried by the parasail is secured to the parasail by a harness. A seated harness is recommended, attached to the life jacket by either using loops on the life jacket to feed the harness through or by straps over the parasailor’s shoulders.

4.5. Failure of the winch

The inability to winch a parasailor back towards the vessel is also a key safety concern with parasailing. The 2009 US Coastguard study covering 27 parasailing accidents (referred to earlier) found that “failure of the vessel's hydraulic winch was a contributing factor in 11 of the cases. In these cases, high winds placed strains on the winch beyond its capability, and the winch failed to reel in the passengers.”7 Furthermore, testing by investigators for the NTSB suggested that hydraulically powered winches would be likely to be incapable of reeling in aloft passengers in conditions where the combined vessel and wind speed was near or above 33 miles per hour (53kmh). The NTSB noted that the “results, although

7 National Transportation Safety Board, Parasailing Safety: Special investigation report, p.8, 2014.
approximate, indicate that parasailing in high winds can produce shear stress on the shaft that far exceeds its capacity."\(^8\)

All winch arrangements should be fit for purpose to match the chute and vessel.

The winch should be fitted with the following safety cut-out devices:

- a device enabling the emergency cutting off of power to the winch motor at a point on the vessel separate from the winch controls
- for winches with a sheave to receive the winch rope, a device to cut out the winch motor to stop the winch rope hitch and parasail harness assembly being wound in past the sheave
- for winches with no sheave to receive the winch rope, a device to cut out the winch motor to stop the winch rope hitch and parasail harness assembly being wound into contact with the winch.

The winch should be controlled and operated only by the vessel’s skipper or crew.

All vessels should have a winch gauge, which should be clearly marked and visible to the skipper of the vessel at all times. This marking can be achieved by attaching the winch cable to a fixed object, slowly applying engine throttle until full power, reading and recording the winch pressure, and marking the gauge with the maximum thrust pressure reading.

The winch retrieval time should be a maximum of five minutes to respond to emergency situations.

4.6. Parasailors drifting over land

It is the skipper’s responsibility to determine a safe operating distance from any downwind shoreline to ensure, if there is a mechanical failure, that the parasail canopy and passengers will not drift ashore.

The skipper should not conduct parasailing on a lee shore unless the skipper has done an appropriate assessment of the risks involved and decided it is safe to parasail.

Note: If there is an equipment failure, the risk of injury is considerably greater than normal on a lee shore.

If parasailing is conducted on a lee shore, the skipper should not allow the parachute to pass within a distance from the shore equal to:

\(^8\) Ibid., p.23.
• the length of the winch rope for a wind speed of up to 9 knots
• twice the length of the winch rope for a wind speed of more than 9 knots but not more than 13 knots
• three times the length of the winch rope for a wind speed of more than 13 knots.

Operators should develop operating policies to cover operations near shoreline and obstructions.

4.7. Harm through controlled dipping
Dipping should not occur any deeper than the knee when the parasailor is moving across the water (although the level of dipping could be deeper when stationary). At no time while dipping should the towline be able to touch the flight deck.

4.8. Harm through contact with machinery
All crew and passengers should be protected from winch equipment and machinery by protective guards and clear signage.

4.9. Drowning
Civil Aviation Rule Part 101 (Subpart F, 101.263 (Safety equipment)) states that a person operating a parasail must ensure that each person carried by the parasail when flying over water, or within gliding distance of water, wears a positive buoyancy aid. This buoyancy aid should not have a rating lower than 71 Newton (N), and should have a neck collar. Life jackets should also be worn by people on the flight deck.

Vessels should have a high level of manoeuvrability to quickly and safely recover parasailors from the water (including being able to hold a stationary position near them). Vessels should also have a swim ladder or platform extending below the surface of the water to ensure that parasailors can exit the water easily.

4.10. Being overpowered by wind
Parasail vessels should not operate in wind conditions in which the vessel is not capable of maintaining a forward speed of at least 5 knots while the bow is pointing directly into the wind, in the parasail mode, with passengers aloft.

Inability to maintain a windward speed of at least 5 knots means there is significant power in the canopy. If windward boat speed is impossible, there is no control of the canopy and the vessel would be considered overpowered. If there is a mechanical failure, the downwind
distance required for a controlled water landing is much greater and the canopy recovery process more difficult.

4.11. Cold temperatures

Passengers and parasailors may be at risk of hypothermia if it rains or is cold, so they should be advised to dress warmly if the weather on the trip is likely to be wet or cold. Operators should have blankets or warm clothing for parasailors if required in an emergency.

5. Where to get further information

Civil Aviation Rules (go to www.caa.govt.nz and click on ‘Rules’)


Maritime Transport Rules (go to www.maritimenz.govt.nz and click on ‘Rules’)

‘Support Adventure’, the website for the adventure tourism and outdoor commercial sector (for assistance to develop your safety system, go to www.supportadventure.co.nz)
Appendix A: Recommended procedure and test for intact stability of parasail vessels

A.1. Parasail vessel information

The following information should be collected for all parasail vessels.

- Length overall (LOA) m
- Load Waterline Length (LWL) m
- Breadth overall (BOA) m
- Maximum beam at the waterline (BWL) m
- Deadrise amidships deg
- Draft m
- Displacement t
- Passenger numbers
- Engine make & model
- Engine power HP
- Engine RPM RPM
- Gear box ratio
- Prop diameter inch
- Bollard thrust (T) kg
- Limit tow force ($F_{limit}$) kg

A.2. Test procedures

The following procedures describe practical stability tests for parasail vessels. These procedures draw on some of the information set out in A.1.

A.2.1. Bollard thrust

Theoretical or actual bollard thrust may be obtained through theoretical calculation, practical test or thrust curves provided by engine and propeller suppliers.

**Theoretical calculation**

Inputs
- Engine power (P) (HP)
- Propeller diameter (D) (inches)

Theoretical bollard thrust ($T$) (kg)
- $T$ (kg) = 5.274 x (P x D)$^{0.67}$
A.2.2. Practical bollard pull test

The following steps should be carried out as a practical bollard pull test:
1. Secure winch cable to wharf pile via load cell or to a known mass via block and tackle system.
2. Slowly apply engine power until full throttle is attained.
3. Read load cell or add/remove weights until thrust is balanced by weights.
4. Record load and back-calculate as required to obtain bollard thrust in kilograms.

**Limit tow force** ($F_{\text{limit}}$)

- $F_{\text{limit}} = T \times 0.5$ (kg).

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Caution: Extreme care is required when conducting a practical bollard thrust test. High loads present a significant hazard to personnel and vessel stability.

A.2.3. Parachutes

The tow force chute load should not exceed the limit tow force ($F_{\text{limit}}$) calculated for the bollard thrust (as discussed above). Maximum parachute loads should be calculated for every canopy being used.

Where estimated parachute loads exceed 50% of bollard thrust, limits that further restrict passenger weight and maximum wind speed should be imposed for that chute.
A.2.4. Heeling test

Vessels should be tested when loaded with the maximum number of passengers, gear and equipment and 10% fuel condition to ascertain the angle of heel and position of the waterline that would result if:

- all of the passengers the ship is certified to carry are assembled along one side of the ship
- a helmsman is at the helm and crew are in position
- a load is applied at the vessel’s tow point in accordance with the test force in the box below.

**Tow point load for heel test**

Calculations should be based on:

**Inputs**

- Limit tow force, \( F_{\text{limit}} = T \times 0.5 \) (kg)

**Test force (\( H_t \)) (kg)**

- \( H_t = F_{\text{limit}} \times 0.5 \).

A.2.5. Practical heel test

The following steps should be carried out as a practical heel test:

1. Position vessel alongside wharf with vertical piles or vertical rigid fenders.
2. Secure winch cable to wharf pile via load cell.
3. Weigh passengers for inclining to verify total weight.
4. Slowly move passengers to wharf side of vessel and measure heel angle.
5. Return passengers to seated positions.
6. Slowly apply winch power until test load is read on load cell, and record heel angle.

For the purpose of the test:

- each of the passengers and the helmsman should be represented by a mass of at least 75kg distributed at four passengers per square metre
- all gear and equipment should be stowed in the normal location
- outboard motors should be in the operating position.
The results of the heel test should show that:

- the angle of heel does not exceed 10° under passenger crowding
- the angle of heel does not exceed 20° under combined passenger crowding and tow heeling force
- the freeboard to the deck or, if the ship has no side deck, to the top of the cockpit coaming, is not less than 75mm at any point
- the freeboard at the transom is not less than 75mm.

Where the vessel is fitted with a raised weathertight aft deck (‘flight deck’) and flush weathertight deck with bulwarks/gunwale amidships, a lesser freeboard at the transom may be accepted providing the vessel is not an outboard-powered vessel and freeboard at the critical down-flooding point is not less than 75mm.

**A.3. Freeing and bilge pumping**

Water flooding the cockpit should be:

- capable of being drained within three minutes (this may be achieved by any combination of freeing ports and pumps)
• prevented from entering any machinery space (propulsion machinery, pumping and winch gear)
• prevented from downflooding to the bilge except for contained compartments and sumps specifically for the purpose of draining water via bilge pumps.

Freeing ports, if fitted, should not allow backflooding into the cockpit under the practical heeling test condition or when the vessel is operating in reverse.
Appendix B: Subparts A and F of Civil Aviation Rule Part 101: Gyrogliders and Parasails; and Unmanned Balloons, Kites, Rockets and Model Aircraft – Operating Rules

(CAA Consolidation 1 April 2014)

Subpart A — General

101.1 Applicability

This Part prescribes rules governing the operation of—

(1) moored balloons and kites:
(2) free balloons:
(3) rockets:
(4) model aircraft:
(5) gyrogliders and parasails.

101.3 Definitions

In this Part—

**Aerodrome** means an aerodrome that is promulgated in the current AIPNZ Volume 4:

**Controlled aerodrome** means an aerodrome at which air traffic control service is provided to aerodrome traffic:

**Control line model aircraft** means a model aircraft primarily controlled in flight by a single or multiple wire system operated by the person flying the aircraft and restricted to circular flight about a central point:

**Free Balloon** means a pilotless aerostat without propulsion in free flight, having a gas capacity greater than 1.5 m³:

**Free flight model aircraft** means a model aircraft with a maximum wing loading of 62 g/dm² (20 oz/ft²), with a flight path that, once launched, is uncontrollable:

**Gyroglider** means a ground or water towed non-power-driven heavier-than-air aircraft supported in flight by the reaction of the air on one or more rotors which rotate freely on substantially vertical axes, capable of carrying a person or persons

**Heavy free balloon** means a free balloon, that—

(1) carries a payload with—
   (i) a combined mass of 6 kg or more; or
   (ii) a payload package of 3 kg or more; or
   (iii) a payload package of 2 kg or more with an area density of more than 13 g/cm²; and

(2) uses a rope or other device for suspension of the payload that requires an impact force of 230 N or more to separate the suspended payload from the balloon:
Kite means a pilotless aerodyne without propulsion that is tethered to a fixed point, or is hand held, and is sustained by the wind:

Large model rocket means a rocket that—

(1) uses more than 25 g but not more than 125 g of propellant; and
(2) produces more than 20 but not more than 320 Newton seconds of total impulse; and
(3) uses a slow-burning propellant; and
(4) is made of lightweight materials such as paper, wood, rubber and plastic; and
(5) does not have the nose cone, fins, or body fabricated from metal; and
(6) has a gross mass, including the propellant of more than 453 g but not more than 1.5 kg:

Medium free balloon means a free balloon, that—

(1) carries a payload of 2 or more payload packages with a combined mass of—
   (i) more than 4 kg; and
   (ii) less than 6 kg; and
(2) does not meet any of the criteria specified in the definition of the term heavy free balloon:

Model aircraft means a pilotless aircraft with a gross mass of between 100 g to 25 kg and includes—

(1) control line model aircraft:
(2) free flight model aircraft:
(3) radio controlled model aircraft:

Model Rocketry Safety Code means the code of that name that is approved by the New Zealand Rocketry Association:

Moored balloon means a pilotless balloon that is moored to the surface of the earth, or to an object on the surface of the earth, and has a maximum diameter of more than 1.5 m or a gas capacity of more than 3 m³:

Parasail means an aerodyne, having the general form of an open, circular parachute carrying a person or persons towed behind a vehicle or motorboat to sustain flight:

Radio controlled model aircraft means a model aircraft that is primarily controlled by radio signals from a remote transmitter being operated by a person:

Rocket means a pilotless vehicle propelled by a system that contains every ingredient needed to form its own jet other than—

(1) an aerial firework; or
(2) a rocket propelled by a model rocket motor of size A-D which achieves no more than 20 Newton-seconds of total impulse:

Shielded operation means an operation within 100 m of a structure and below the top of the structure.
101.5 Registration

The requirements in Part 47 shall not apply to moored balloons, free balloons, rockets, kites, model aircraft, parasails, and gyrogliders.

101.7 Restricted, military operating, and danger areas

(a) A person must not operate a moored balloon, kite, free balloon, rocket, model aircraft, gyroglider, or parasail within a restricted area designated under Part 71 unless the person has approval to do so from the administering authority responsible for the restricted area.

(b) A person must not operate a moored balloon, kite, free balloon, rocket, model aircraft, gyroglider, or parasail within a military operating area designated under Part 71 unless the person has approval to do so from the administering authority responsible for the military operating area.

(c) A person must not operate a gyroglider or parasail within a danger area designated under Part 71 unless the person has established that the activity associated with the danger area will not affect the safety of the gyroglider or parasail.

101.9 Low flying zones

A person must not operate a moored balloon, kite, free balloon, rocket, model aircraft, gyroglider, or parasail within a low flying zone designated under Part 71.

101.11 Controlled airspace

A person shall not operate a moored balloon, kite, free balloon, rocket, model aircraft, gyroglider, or parasail in controlled airspace without prior authorisation from the ATC unit responsible for that airspace.

101.13 Hazardous operations

A person shall not operate a moored balloon, kite, free balloon, rocket, model aircraft, gyroglider, or parasail in a manner that creates a hazard to aircraft or to persons or property.

101.15 Dropping of articles

A person operating a moored balloon, kite, free balloon, rocket, model aircraft, gyroglider, or parasail shall not allow any object to be dropped in flight if such action creates a hazard to other persons or property.
Subpart F — Gyrogliders and Parasails

101.251 Applicability

This Subpart prescribes rules governing the operation of gyrogliders and parasails.

101.253 Aerodromes

(a) A person must not operate a gyroglider or parasail on an aerodrome or within 4 km of an aerodrome boundary unless—

(1) at an uncontrolled aerodrome, the gyroglider or parasail is operated—

(i) in accordance with an agreement with the aerodrome operator; and

(ii) at a height not exceeding 400 feet AGL; or

(2) at a controlled aerodrome, the gyroglider or parasail is operated in accordance with an authorisation from the aerodrome air traffic control service.

(b) A person must not operate a gyroglider or parasail—

(2) on or over any aircraft movement area of an aerodrome; or

(3) on or over any active runway or runway strip area of an aerodrome.

101.255 Airspace

A person operating a gyroglider or parasail above a height of 400 feet AGL must—

(1) ensure that the gyroglider or parasail remains more than 4 km from any aerodrome boundary; and

(2) operate in Class G airspace; and

(3) provide the following information to the New Zealand NOTAM office at least 24 hours before the operation:

(i) the name, address, and telephone number of the operator:

(ii) the date, time, and duration of the operation:

(iii) a brief description of the gyroglider or parasail (including size and predominant colour):

(iv) the height to which the gyroglider or parasail will be operated.

101.257 Meteorological limitations

(a) Except as provided in paragraph (b), a person operating a gyroglider or parasail must—

(1) not operate closer than 400 feet below cloud; and

(2) limit operations to an area where the ground visibility is at least 5 km.

(b) Paragraph (a) does not apply to the shielded operation of a gyroglider or parasail.

101.259 Night operations

A person must not operate a gyroglider or parasail at night.
101.261 Airworthiness

A person who operates a gyroglider or parasail must ensure that it is fit for the intended purpose and is maintained in an airworthy condition in accordance with the manufacturer's instruction.

101.263 Safety equipment

A person operating a gyroglider or parasail must ensure that each person carried by the gyroglider or parasail—

1. when flying over water, or within gliding distance of water, wears a positive buoyancy aid; and
2. wears a rigid protective helmet; and
3. is secured to the gyroglider or parasail by a harness; and
4. for a parasail operation conducted with an extended towline length exceeding 600 feet, as measured from the winch drum to the parasail canopy yoke, is equipped with a positive means of communicating with the parasail operator if an emergency occurs.

101.265 Pre-flight briefing

A person operating a gyroglider or parasail must ensure that each person carried by the gyroglider or parasail receives a pre-flight briefing on—

1. the nature of the flight; and
2. the standard operating procedures; and
3. the emergency procedures including:
   i. the location and use of emergency equipment;
   ii. the procedures to be followed in the event of a water landing, or towline separation; and
   iii. the method for communicating with the gyroglider or parasail operator if an emergency occurs.

101.267 Emergency towline release

A person must not release the towline of a gyroglider or a parasail in flight except in an emergency.

101.269 Operating procedures

A person operating a gyroglider or parasail must do so in accordance with the operating procedures and limitations recommended by the manufacturer.

101.271 Wind speed

A person operating a parasail must—

1. use a method or device to accurately determine and monitor the wind speed at the location where the parasailing operation is being conducted; and
2. not conduct a parasailing operation in conditions where the sustained wind speed exceeds 20 knots.
101.273 Passenger age limitation

A person operating a parasail must not—

(1) perform a parasailing operation with an extended towline length of more than 300 feet, as measured from the winch drum to the parasail canopy yoke, when carrying any solo passenger who is between 8 and 11 years old; and

(2) perform a parasailing operation with a passenger carried by a parasail who is less than 8 years old unless the passenger is accompanied by another passenger who is at least 18 years old, and is able to assist the younger passenger if an emergency occurs.